

REMARKS

Claims 1-25 are pending and under consideration. In the Final Office Action of June 2, 2006, the Examiner made the following disposition:

- A.) Rejected claims 1 and 14 under 35 U.S.C. §102(e) as allegedly being anticipated by *Merrill '521*.
- B.) Rejected claims 2 and 15 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Merrill '253*.
- C.) Rejected claims 3 and 16 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Kon*.
- D.) Rejected claims 7-9 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Nakagawa*.
- E.) Rejected claim 10 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Uya, et al.* in view of Applicants' submitted art.
- F.) Rejected claims 11-13 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Uya, et al.* in view of Applicants' submitted art and in view of *Nakagawa*.
- G.) Rejected claim 17 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Isogai, et al.*
- H.) Rejected claim 18 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Suzuki*.
- I.) Allowed claims 4-6 and 20-24.
- J.) Objected to claim 19.

Applicants respectfully traverse the rejections and address the Examiners disposition below.

- A.) Rejection of claims 1 and 14 under 35 U.S.C. §102(e) as allegedly being anticipated by *Merrill '521*:

Applicants respectfully disagree with the rejection.

Independent claims 1 and 14 each claim subject matter relating to transferring electrons accumulated in a photodiode to a detection portion. The gate voltage of a transfer transistor when the electrons are accumulated in the photodiode is set to a negative voltage.

This is clearly unlike *Merrill '521*, which fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. To begin with, *Merrill*

'521 accumulates charges, not electrons, in its photodiode. *Merrill '521* 11:23. Further, as clearly discussed in the *Merrill '521* passage cited by the Examiner, *Merrill '521*'s gate voltage signal XFR "is asserted throughout the reset period and the integration period and is de-asserted to end the integration period as illustrated in FIG. 6A." *Merrill '521* 11:27-29 (emphasis added). As clearly shown in *Merrill '521* FIG. 6A, the XFR signal is set to a positive voltage during the charge accumulation period, which is called the "exposure" period. *Merrill '521* 11:23. The XFR signal is de-asserted to end the integration period and is set to "zero or a slightly negative voltage." *Merrill '521* 11:30-31. Thus, unlike Applicants' claimed invention, *Merrill '521*'s gate voltage is set to a positive voltage when charges are accumulated in a photodiode.

Thus, for at least these reasons, *Merrill '521* fails to disclose or suggest claims 1 and 14.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

B.) Rejection of claims 2 and 15 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Merrill '253*:

Applicants respectfully disagree with the rejection.

Independent claims 1 and 14 are allowable over *Merrill '521* as discussed above. *Merrill '253* still fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. Therefore, *Merrill '521* in view of *Merrill '253* still fails to disclose or suggest claims 1 and 14.

Claims 2 and 15 depend directly or indirectly from claim 1 or 14 and are therefore allowable for at least the same reasons that claims 1 and 14 are allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

C.) Rejection of claims 3 and 16 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Kon*:

Applicants respectfully disagree with the rejection.

Independent claims 1 and 14 are allowable over *Merrill '521* as discussed above. *Kon* still fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. Therefore, *Merrill '521* in view of *Kon* still fails to disclose or suggest claims 1 and 14.

Claims 3 and 16 depend directly or indirectly from claim 1 or 14 and are therefore allowable for at least the same reasons that claims 1 and 14 are allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

D.) Rejection of claims 7-9 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Nakagawa*:

Applicants respectfully disagree with the rejection.

Independent claim 1 is allowable over *Merrill '521* as discussed above. *Nakagawa* still fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. Therefore, *Merrill '521* in view of *Nakagawa* still fails to disclose or suggest claim 1.

Claims 7-9 depend directly or indirectly from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

E.) Rejection of claim 10 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Uya, et al.* in view of Applicants' submitted art:

Applicants respectfully disagree with the rejection.

Referring to Applicants' Figure 7 for illustrative purposes, independent claim 10 claims a solid-state image pickup device including pixels each of which comprises a photodiode, a detection portion and a transfer transistor for transferring charges accumulated in the photodiode to the detection portion. An overflow path for discharging charges overflowing from the photodiode is formed in a bulk out of a channel portion 54 of the transfer transistor and discharges the charges in a depth direction of a substrate.

This is clearly unlike *Uya* in view of Applicants' submitted art. As acknowledged by the Examiner, *Uya* fails to teach an overflow path formed in a bulk out of a channel portion. *Office Action of 6/2/06*, page 9. The Examiner alleges that the Applicants disclose an overflow path formed in a bulk out of a channel portion in Applicants' Background of the Invention, however, that is not true. In the Background of the Invention, Applicants merely describe that conventional devices includes an overflow path in a channel portion. This is shown in an

illustrative example in Applicants' Figure 11. Contrary to the Examiner's statement, in the Background of the Invention, Applicants do not describe that the conventional art includes an overflow path formed in a bulk out of a channel portion.

Therefore, neither *Uya* nor the disclosed conventional art teach an overflow path formed in a bulk out of a channel portion. Accordingly, *Uya* in view of Applicants' submitted art fails to disclose or suggest claim 10.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

F.) Rejection of claims 11-13 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Uya, et al.* in view of Applicants' submitted art and in view of *Nakagawa*:

Applicants respectfully disagree with the rejection.

Independent claim 10 is allowable over *Uya* in view of Applicants' submitted art as discussed above. *Nakagawa* still fails to disclose or suggest an overflow path for discharging charges overflowing from a photodiode that is formed in a bulk out of a channel portion of a transfer transistor and that discharges the charges in a depth direction of a substrate. Therefore, *Uya* in view of Applicants' submitted art and in view of *Nakagawa* still fails to disclose or suggest claim 10.

Claims 11-13 depend directly or indirectly from claim 10 and are therefore allowable for at least the same reasons that claim 10 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

G.) Rejection of claim 17 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Isogai, et al.*:

Applicants respectfully disagree with the rejection.

Independent claim 14 is allowable over *Merrill '521* as discussed above. *Isogai* still fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. Therefore, *Merrill '521* in view of *Isogai* still fails to disclose or suggest claim 14.

Claim 17 depends directly or indirectly from claim 14 and is therefore allowable for at least the same reasons that claim 14 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

H.) Rejection of claim 18 under 35 U.S.C. §103(a) as allegedly being unpatentable over *Merrill '521* in view of *Suzuki*:

Applicants respectfully disagree with the rejection.

Independent claim 14 is allowable over *Merrill '521* as discussed above. *Suzuki* still fails to disclose or suggest a gate voltage that is set to a positive voltage when electrons are accumulated in a photodiode. Therefore, *Merrill '521* in view of *Suzuki* still fails to disclose or suggest claim 14.

Claim 18 depends directly or indirectly from claim 14 and is therefore allowable for at least the same reasons that claim 14 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

I.) Allowance of claims 4-6 and 20-24:

Applicants respectfully acknowledge the Examiner's finding of allowable subject matter in claims 4-6 and 20-24.

J.) Objection to claim 19:

Applicants respectfully acknowledge the Examiner's finding of allowable subject matter in claim 19.

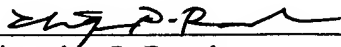
Independent claim 14 is allowable as discussed above. Claim 19 depends directly or indirectly from claim 14 and is therefore allowable for at least the same reasons that claim 14 is allowable.

Applicants respectfully submit the objection has been overcome and request that it be withdrawn.

CONCLUSION

It is submitted that claims 1-24 are patentable and that the application is in condition for allowance. Notice to that effect is requested.

Respectfully submitted,



(Reg. No. 45,034)

Christopher P. Rauch

SONNENSCHN NATH & ROSENTHAL LLP

P. O. Box 061080

Wacker Drive Station - Sears Tower

Chicago, Illinois 60606-1080

Telephone (312) 876 8000

Customer No. 26263